

CURRICULUM SEGMENTS

CAPSTONE II

EQUIPMENT

TRAINING

**Capstone II
121/135 Training Program**

(Air Carrier Name inserted here)

D-ii/R-01/2-20-03

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D-1/R-01/2-20-03

INTRODUCTION

Section D of this manual serves as the curriculum segments / lesson plans for the Capstone II Equipment ground Training.

The curriculum segments are laid out in outline form to capture 100% of the available topics on the use of the Capstone Equipment.

The Curriculum segments if used as a checklist will provide a means of assuring that all relevant material is covered.

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D-2/R-01/2-20-03

LESSON PLAN: HISTORY OF GPS

OBJECTIVE: Provide the airmen involved in Capstone with an understanding of GPS its history and how it functions.

INSTRUCTIONAL DELIVERY METHODS: Lecture

TESTING/CHECKING: Oral exam

1) The History of GPS.

- (1) October 1957 the Launch of Sputnik.
- (2) US military programs TRANSIT system in 1964.
- (3) TIMATION I launched by U.S. Navy in 1967.
- (4) NAVSTAR GPS program in 1973 with USAF and US Navy.
- (5) Korean Airlines Flight 007 in 1983.
- (6) Seven Satellites in 1985.
- (7) Full Operational Coverage on April 27, 1995 with 24 satellites.
- (8) Agreement between US-DoD and the US department of transportation.
- (9) Civil Authorization

2) The Function of GPS components.

- (1) The satellite constellation Space Vehicles (SV).
- (2) Ground Stations.
- (3) Controls on the system.
- (4) (SPS) and (PPS) signals.
 - a. Descriptions and acronyms.
 - b. Limitations.

EXAM: a quick oral to ensure all participants have a ready reference capability to definitions, descriptions and acronyms.

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D-3/R-01/2-20-03

LESSON PLAN: **CAPSTONE SAFETY INITIATIVE**

OBJECTIVE: Provide the Airman with an understanding of the background and history of Capstone

REFERENCES: FAA Capstone literature. Capstone Web Site
www.alaska.faa.gov/capstone

COURSEWARE: Transparencies, overhead projector or PowerPoint

INSTRUCTIONAL DELIVERY METHODS: Lecture,

TESTING / CHECKING: NONE

STANDARD: N/A

- 1) HALALASKA PROJECT
- 2) SAFE FLIGHT 2000
- 3) CAPSTONE I and CAPSTONE II
- 4) INDUSTRY AND THE FAA
- 5) UAA / FAA CONTRACT
- 6) SAFETY STUDY
- 7) USER INPUT
- 8) TRAINING
- 9) FUTURE OF CAPSTONE
- 10) CAPSTONE WEB SITE

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D-4/R-01/2-20-03

LESSON PLAN: INTRODUCTION & SYSTEM OVERVIEW

OBJECTIVE: Provide the pilot operator of the Capstone installed avionics with the ability to activate the system and determine that it is operating properly prior to operation.

Examine system limitations to alert pilot operators to limitations and the potential for misuse or error in the system.

REFERENCES: Pilots operating guide and student handbook

COURSEWARE: Student handbook, PFD / PND (Primary Flight Display/Primary Navigation Display) simulator, overhead projector and transparencies or Power Point slides..

INSTRUCTIONAL

DELIVERY METHOD: Lecture, demonstration, hands on participation.

TESTING/CHECKING: Written or Oral exam

STANDARD: The minimum passing score is 100%. The airman must have total understanding of basic functions in order to gain the required knowledge in other segments.

1. Sierra EFIS features / getting started.

- i) General description / Acronyms and Abbreviations
 - a. Primary flight display / Coloring Conventions
 - b. Navigation display / Coloring Conventions
- ii) System Configuration
 - a. MFD / PFD
 - b. AHRS (Attitude Heading and Reference System)
 - c. GPS
- iii) Operational Warnings

**“DO NOT FLY WITH YOUR CHELTON EFIS IF YOU
DO NOT FULLY UNDERSTAND EACH WARNING...”**

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D-5/R-01/2-20-03

LESSON PLAN: CAUTION / WARNING / ADVISORY SYSTEM

OBJECTIVE: Provide the user of the CFHELTON EFIS a thorough understanding of the parameters that provide the auditory annunciations for conditions that demand pilot attention.

REFERENCES: Pilots operating guide and student handbook

COURSEWARE: Student handbook, PFD / PND simulator, overhead projector and transparencies or Power Point slides.

INSTRUCTIONAL DELIVERY METHODS: Lecture, demonstration, and hands on exercises

TESTING / CHECKING: Student handbook exercises

STANDARD: Minimum passing score 70%

1) Warning

- (i) Voice Warnings
- (ii) High/low-tone warble

2) Caution

- (i) Voice warnings
- (ii) High/low-tone warble

3) Advisory

- (i) Voice Warnings
- (ii) High/low-tone warnings

4) Multiple auditory annunciations

- (i) Critical priority
- (ii) Stacking Flags

This module (D-5) and the prior module (D-4) should be accomplished with repeated demonstration and discussion to insure the pilot operator of the system is thoroughly familiar with the system and its limitations.

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D-6/R-01/2-20-03

LESSON PLAN:	SYSTEM COMPONENTS / CONTROLS
OBJECTIVE:	Provide the Airman with the skills required to Use the system components of the MFD and PFD
REFERENCES:	Pilots operating guide and student handbook
COURSEWARE:	Student handbook, MFD/PFD simulator, overhead projector and transparencies or Power Point slides.
INSTRUCTIONAL DELIVERY METHODS:	Lecture, demonstration, hands on exercises
TESTING / CHECKING:	Student handbook exercises
STANDARD:	Minimum passing score 70%
 1) Brightness knob (i) Screen (ii) Buttons & slip indicator	
 2) Menu control knob (i) Highlight the desired menu	
 3) Menu buttons (ii) Selecting a screen menu	
 4) Dedicated buttons (iii) Heading Bug (iv) Nearest (v) Direct	
 5) Reinitializing the system	

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D-7/R-01/2-20-03

LESSON PLAN: **SYSTEM COMPONENTS / ATTITUDE / HEADING
REFERENCE SYSTEM**

OBJECTIVE: Provide the Airman with an understanding of the
AHRS

REFERENCES: Pilots operating guide and reference

COURSEWARE: Student handbook, MFD/PFD simulator, overhead
projector and transparencies or Power Point slides

**INSTRUCTIONAL
DELIVERY METHODS:** Lecture, demonstration, hands on exercises

TESTING / CHECKING: Student handbook exercises

STANDARD: Minimum passing score 70%

1) System description

2) System limitations

(i) Failure Modes

3) Warnings

(i) Proper power up

(ii) Proper initialization

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D-8/R-01/2-20-03

LESSON PLAN: **SYSTEM COMPONENTS / GPS Receiver**

OBJECTIVE: Provide the Airman with the skills required to
 Use the system components of the MFD and PFD

REFERENCES: Pilots operating guide and reference

COURSEWARE: Student handbook, MFD/PFD simulator, overhead
 projector and transparencies

INSTRUCTIONAL

DELIVERY METHODS: Lecture, demonstration, hands on exercises

TESTING / CHECKING: Student handbook exercises

STANDARD: Minimum passing score 70%

- 1) **GPS Overview**
- 2) **GPS Accuracy**
- 3) **Component Failure Modes**

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D-9/R-01/2-20-03

LESSON PLAN: DISPLAY SYMBOLOGY

OBJECTIVE: Provide the pilot operator of the Capstone installed avionics with the ability to properly interpret the display symbology.

Practice adding and removing symbology and examine its use.

REFERENCES: Pilots operating guide and student handbook.

COURSEWARE: Student handbook, PFD / PND simulator, overhead projector and transparencies or Power Point slides.

INSTRUCTIONAL

DELIVERY METHOD: Lecture, demonstration, hands on participation.

TESTING/CHECKING: Written or Oral exam

STANDARD: The minimum passing score is 100%. The airman must have total understanding of all display symbology in order to properly utilize the system.

1) PFD Symbology

- a. Basic PFD
- b. PFD on Approach (Terrain on)
- c. PFD on Approach (Terrain Off)
- d. Unusual Attitude Recovery Mode

2) Navigation Display Symbology

- a. Basic Moving Map
 - b. Moving Map with instrument approach
 - c. Moving Map with STAR
 - d. Conventional HIS Format
 - e. Traffic Display
 - f. North-Up Arc Mode
 - g. North-Up Centered Mode
 - h. Heading-Up Centered Mode
 - i. Failure Modes
 - j. GPS, ADC, and AHRS Failure
-

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D-10/R-01/2-20-03

LESSON PLAN: MFD MENU FUNCTIONS

OBJECTIVE: Provide the pilot operator of the Capstone installed avionics with the ability to properly display and use the menu functions.

REFERENCES: Pilots operating guide and student handbook.

COURSEWARE: Student handbook, PFD / PND simulator, overhead projector and transparencies or Power Point slides.

INSTRUCTIONAL

DELIVERY METHOD: Lecture, demonstration, hands on participation.

TESTING/CHECKING: Written or Oral exam

STANDARD: The minimum passing score is 70%.

1. MFD Menu Functions

- a. Primary Flight Display Menus
 - i. Button and Control Knob Functions (PFD)
 - ii. PFD Menus

- b. Navigation Display Menus
 - i. MFD top level Soft Menu.
 - ii. MFD top level Soft Menus.

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D-11/R-01/2-20-03

LESSON PLAN: WAYPOINTS

OBJECTIVE: Provide the pilot operator of the Capstone installed avionics with the ability to select, insert and delete waypoints in flight plans.

REFERENCES: Pilots operating guide and student handbook.

COURSEWARE: Student handbook, PFD / PND simulator, overhead projector and transparencies or Power Point slides..

INSTRUCTIONAL

DELIVERY METHOD: Lecture, demonstration, hands on participation.

TESTING/CHECKING: Demonstrated ability to select, insert and delete Waypoints in an active flight plan.

STANDARD: The minimum passing score is 100%. Routes and waypoints in those routes are essential to proper and safe operation of the Capstone II equipment.

1. Generate a waypoint by Latitude and Longitude

a. Student workbook exercises

2. Generate a waypoint by Radial and Distance

b. Student workbook exercises

3. Generate a waypoint for present position

c. Student workbook exercises

4. Select a Waypoint within a route

d. Student workbook exercises

5. Add a Waypoint to an Active route

e. Student workbook exercises

6. Delete a Waypoint from an Active route

f. Student workbook exercises

7. Edit a user waypoint

g. Student workbook exercises

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D-12/R-01/2-20-03

LESSON PLAN: FLIGHT PLANS

OBJECTIVE: Provide the pilot operator of the Capstone installed avionics with the ability to Create Edit and Activate flight plans using the CHELTON EFIS system.

REFERENCES: Pilots operating guide and student handbook.

COURSEWARE: Student handbook, PFD / PND simulator, overhead projector and transparencies or Power Point slides..

INSTRUCTIONAL

DELIVERY METHOD: Lecture, demonstration, hands on participation.

TESTING/CHECKING: Creating, Editing and Activating Flight Plans.

STANDARD: The minimum passing score is the demonstrated ability to create, edit and activate a flight plan.

1) Create a Flight Plan

- a. Flight Plan exercise "A" from student handbook
- b. Flight Plan exercise "B" from student handbook
- c. Flight Plan exercise "C" from student handbook

2) Edit an existing Flight Plan

- a. Flight Plan exercise "D" from student handbook
- b. Flight Plan exercise "E" from student handbook
- c. Flight Plan exercise "F" from student handbook

3) Reverse a Flight Plan

4) Delete a Flight Plan

5) Use a Flight Plan

- a. Activate Flight plan "A"
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D-13/R-01/2-20-03

LESSON PLAN: APPROACHES DP's AND STARs

OBJECTIVE: Provide the pilot operator of the Capstone installed avionics with the ability to select, load and activate approaches, DP's and STARs.

REFERENCES: Pilots operating guide and student handbook.

COURSEWARE: Student handbook, PFD / PND simulator, overhead projector and transparencies or Power Point slides..

INSTRUCTIONAL

DELIVERY METHOD: Lecture, demonstration, hands on participation.

TESTING/CHECKING: Demonstrated ability to select, load and activate approaches, DP's and STARs.

STANDARD: The minimum passing score is 100%.

1. Select a VFR approach
2. Select an IFR approach
3. Select a DP
4. Select a STAR
5. Missed Approach Arming Procedure
6. Change Runway during Approach

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D-14/R-01/2-20-03

LESSON PLAN: “FUNCTIONS” Step-by-Step Procedures

OBJECTIVE: Provide the pilot operator of the Capstone installed avionics with the ability to activate the system and use the functions within the system.

REFERENCES: Pilots operating guide and reference and student handbook.

COURSEWARE: Student handbook, PFD / PND simulator, overhead projector and transparencies or Power Point slides..

INSTRUCTIONAL

DELIVERY METHOD: Lecture, demonstration, hands on participation.

TESTING/CHECKING: Written or Oral exam on use of functions.

STANDARD: The minimum passing score is 70%.

1. Parallel Track Function
 - a. Set a Parallel Track / Turn Parallel Track off
2. Omnibearing Selector function
 - a. Automatic OBS / Manual OBS
3. Timer Functions
 - a. Count Up / Count Down
 - b. Flight Timer
 - c. Turning the Timer Off
4. BUG Functions
 - a. Heading BUG
 - i. Set Heading BUG / Turn Heading BUG Off
 - b. Altitude
 - i. Specify a Target Altitude
 - ii. Turning BUGs Off
 - iii. Specify a Minimum Altitude
 - c. Airspeed
 - i. Specify a Target Airspeed
 - d. VNAV
 - i. Change VNAV settings

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D-15/R-01/2-20-03

LESSON PLAN: Putting it all together

OBJECTIVE: Provide the pilot operator of the Capstone installed avionics with the ability to use the system and all the functions in the flight environment.

REFERENCES: Pilots operating guide, quick reference checklists and student handbook.

COURSEWARE: Student handbook, PFD / PND simulator, overhead projector and transparencies or Power Point slides..

INSTRUCTIONAL

DELIVERY METHOD: Lecture, demonstration, hands on participation.

TESTING/CHECKING: Written and Oral exam on use of functions.

STANDARD: The minimum passing score is 80%.

1. Exercise to use as many elements of the avionics as possible and demonstrate an understanding and proper use of the system.

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D-16/R-01/2-20-03

LESSON PLAN: OPERATIONS MANUAL, OP SPECS & MEL

OBJECTIVE: Provide the pilot operator of the Capstone installed avionics with an understanding of the operational requirements in the operations manual, limitations in the operations specifications and what is allowed by the MEL.

REFERENCES: Operations Manual and MEL

COURSEWARE: Operations Manual and MEL

INSTRUCTIONAL

DELIVERY METHOD: Lecture,

TESTING/CHECKING: Written and Oral exam on Op Specs and MEL.

STANDARD: The minimum passing score is 80%.

1. Review all Operations specifications
2. Review all operations manual procedures
3. Review all MEL items related to Capstone
4. Go through "what if" scenarios for inoperative equipment.
5. Go through "what if" scenarios for CWA items as spelled out in operations procedures in the operations manual.
6. Review special areas and airports in the operations specifications.

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D-17/R-01/2-20-03

LESSON PLAN: **Review**

OBJECTIVE: A comprehensive review of all operational aspects of the Capstone II avionics their limitations and use in the cockpit.

REFERENCES: Pilots operating guide and reference, and student handbook.

COURSEWARE: Student handbook, PFD / PND simulator, overhead projector and transparencies or Power Point slides.

INSTRUCTIONAL

DELIVERY METHOD: Lecture, demonstration, hands on participation.

TESTING/CHECKING: N/A

STANDARD: N/A

- A. Caution / Warning / Advisory System
 - B. System Components / Controls
 - C. System Components / Attitude / Heading Reference System
 - D. System Components / GPS Receiver
 - E. Display Symbolology
 - F. MFD MENU FUNCTIONS
 - G. WAYPOINTS
 - H. FLIGHT PLANS
 - I. APPROACHES DP,s AND STARs
 - J. "FUNCTIONS" Step-by-Step Procedures
 - K. Operations manual, Op Specs and MEL
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D-18/R-01/2-20-03

LESSON PLAN: **Comprehensive ground training final exam.**

OBJECTIVE: Provide the pilot operator of the Capstone installed avionics the opportunity to demonstrate the knowledge and skill levels necessary to operate the system safely.

REFERENCES: Quick reference checklists

COURSEWARE: Student handbook exam, functional avionics training device.

INSTRUCTIONAL

DELIVERY METHOD: This portion will be self administered by the student with the instructor examiner observing to measure effectiveness.

TESTING/CHECKING: Written and Practical exam on all Capstone II avionics functions.

STANDARD: The minimum passing score is 100% for all flight critical Segments.

Instructor notes:

The "Final Exam" must be completed without instructor assistance. The operator of this equipment in flight will only have the equipment itself and any reference material that is available in the aircraft.

The exam is time limited to measure the ability of the operator to make proper inputs within the time constraints of normal flight operations.

Failure to respond to altitude and terrain alerts during the practical application phase of the exam will result in failure and a need for additional training and retesting.